CLAIMS

We claim:

1. (Currently amended) A method of examining biological tissue, comprising the steps of:

radiating a tissue region with a plurality of microwave radiation pulses, said plurality of radiation pulses [[swept across]] spanning a range of microwave frequencies of at least 600 MHz, wherein said tissue region emits a plurality of thermoacoustic signals responsive to said plurality of microwave pulses, and

forming at least one image of said [[breast]] tissue region from said plurality of thermoacoustic signals.

2. (Original) The method of claim 1, wherein said tissue region comprises breast tissue.

3. (Original) The method of claim 2, wherein said at least one image of said breast tissue comprises a plurality of said images, said plurality of images from fractional portions of said breast, further comprising the step of combining said images from said local regions to form an overall image of said breast.

4. (Currently amended) The method of claim 1, wherein said ~~plurality of radiation pulses span a~~ frequency range [[of]] is at least 1 GHz.

5. (Cancelled)

6. (Original) The method of claim 1, wherein said step of forming at least one image comprises adaptive beamforming.

7. (Currently amended)The method of claim 6, wherein said adaptive beamforming comprises the steps of:

providing a sensor array including a plurality of sensor elements, wherein an array steering vector corresponding to a signal of interest (SOI) is unknown;

representing said array steering vector with an ellipsoidal uncertainty set;

bounding a covariance fitting relation for said array steering vector with said uncertainty ellipsoid, and

solving said [[matrix]] covariance fitting relation to provide an estimate of said array steering vector.

8. (Original) The method of claim 1, wherein said pulses include a plurality of different polarizations.

9. (Original) The method of claim 1, further comprising the step of pattern recognition from said image.

10. (Original) The method of claim 9, wherein said step of pattern recognition comprises adaptive signal processing.

11. (Currently amended) A system for examining biological tissue, comprising:

a microwave radiation source for radiating a tissue region with a plurality of microwave radiation pulses, said plurality of radiation pulses [[swept across]] spanning a range of microwave frequencies of at least 600 MHz, wherein said tissue region emits a plurality of thermoacoustic signals responsive to said microwave pulses;

an acoustic transducer array for receiving said thermoacoustic signals, said transducer array providing electrical signals in response thereto, and

an imager for forming at least one image of said tissue region from said electrical signals.

12. (Original) The system of claim 11, further comprising at least one horn antenna coupled to said microwave radiation source for emanating said plurality of microwave pulses.

13. (Original) The system of claim 12, further comprising structure for translating at least one of said transducer array and said antenna.

14. (Original) The system of claim 11, wherein said plurality of radiation pulses span a frequency range of at least 1 GHz.

15. (Cancelled)

16. (Original) The system of claim 11, wherein said pulses include a plurality of different polarizations.